

REMARKS

INTRODUCTION

In accordance with the foregoing, no claims have been amended and claim 33 has been added. Claims 1-33 are pending and under consideration.

CLAIM REJECTIONS – 35 USC 103

Claims 1-4, 12-15, 23 and 24 under 35 USC 103(a) as being unpatentable over Spight (US 4,462,046) (hereinafter "Spight") in view of Corby, Jr. et al. (US 5,745,387) (hereinafter "Corby, Jr.").

Claims 5 and 16 were rejected under 35 USC 103(a) as being unpatentable over Spight in view of Corby, Jr., and further in view of Suyama et al. (US 4,879,664) (hereinafter "Suyama") or Stauffer (US 4,410,804) (hereinafter "Stauffer").

Claims 6, 7, 11, 17, 18 and 22 were rejected under 35 USC 103(a) as being unpatentable over Spight in view of Corby, Jr., and further in view of Maeno et al. (US 5,047,714) (hereinafter "Maeno").

Claims 8, 19, 27 and 30 were rejected under 35 USC 103(a) as being unpatentable over Spight in view of Corby, Jr. et al. in view of Maeno and further in view of Soderberg (US 4,785,528) (hereinafter "Soderberg").

Claims 25 and 26 were rejected under 35 USC 103(a) as being unpatentable over Spight in view of Corby, Jr. and further in view of Soderberg.

Claims 9, 10, 20, 21, 28, 29, 31 and 32 were rejected under 35 USC 103(a) as being unpatentable over Spight in view of Corby, Jr. in view of Maeno et al. and further in view of Sakakibara et al. (JP 07-270137) (hereinafter "Sakakibara").

Spight discusses a machine vision system utilizing programmable optical parallel processing. The scene being viewed by the vision system of Spight has been monitored by a video camera and converted into an electrical signal which produces an optical image on a object reproduction display 10. Simultaneously, a reference display indicative of a desired object to be identified is displayed on a reference display 12 from data stored within a memory of the system control processor. Spight, 3:29-3:38.

One embodiment of Spight would allow the incoherent optical to electrical converters 52 to view a single perspective of the object Ob being viewed. Instead of iterating possible

particular configurations of the object by viewing the object from various positions, a plurality of configurations of each desired object to be identified would be stored within the system control processor 64. For each iteration of the parallel optical processing of Spight, a new reference signal would be provided. Each desired object to be identified would be defined by a plurality of reference signals indicative of a number of particular orientations of the object being viewed. Thus, a plurality of iterations could be performed without the need to vary the apparent perspective of the scene viewed by the incoherent optical to electrical converters 52. Alternatively, the plurality of reference signals could be produced by computer generated rotation of translation images of each object to be identified. Spight, 4:1-4:19.

Corby, Jr. discusses an augmented reality maintenance system employing a manipulator arm with an archive and comparison device. Corby, Jr. discusses that the use of manipulator arms typically requires a method of determining the position and orientation of the distal end of the manipulator arm (and/or its subparts) with respect to the operating environment. This is required to successfully move the manipulator arm through the inspection environment without colliding with structures in the environment. Manipulator arms can be used to determine physical changes in an environment. One problem arises is that irregularities need to be monitored over a period of time (on the order of years) to determine the rate of deterioration. Corby, Jr. states that this is accomplished by moving the manipulator arm to a particular position and videotaping the structure or device which is to be examined. At a later date the manipulator arm is positioned at the same site and current data (such as a video image) is compared to previous data. Since it is very difficult to obtain sensor data with the same parameters, it is difficult to determine differences in the structure over time. This tends to be a hit-or-miss type of adjustment with a very subjective determination being made by the operator. Corby, Jr., 1:44-1:64.

Claim 1

Claim 1 recites: "...a first image capturing device capturing image data of the plurality of objects containing respective images of the objects..." Claim 1 also recites "...a memory storing reference models, each comprising an image of a reference object captured by said image capturing device in a different direction...." As stated in the Office Action, Spight does not disclose that the reference signals are captured using the same imaging device used to capture image data of the object, or storing the orientation of the robot with respect to the reference object. This deficiency in Spight is not cured by Corby, Jr.

In order to make a prima facie case of obviousness, the prior art reference must describe

and enable the claimed invention with sufficient clarity and detail to establish that the subject matter already existed in the prior art and that its existence was recognized by persons of ordinary skill in the field of the invention. Although Corby, Jr. discusses that the use of a manipulator arm requires a method of determining the position and orientation of the distal end of the manipulator arm, Corby, Jr. does not discuss how this is enabled. In the Office Action, only the background section of Corby, Jr. is cited, which does not provide sufficient detail to qualify as prior art for an obviousness rejection.

Further, Corby, Jr. does not disclose that one image capturing device captures reference signals and image data of the object. In Corby, Jr. it appears that the position of the manipulator arm is manipulated by an operator, and that the data of an object is captured. Corby, Jr. merely discloses superimposing an image of the manipulator arm on an image of the environment so as to display the position of the manipulator arm relative to the environment on the monitor as viewed from a user-selected viewpoint. Corby, Jr. does not discuss that reference data of the object is ever captured. As such, neither Spight nor Corby discuss images of a reference object captured by the same image capturing device in different directions.

Withdrawal of the foregoing rejection is requested.

Claims 12 and 23

Independent claim 12 recites: "...a first image capturing device capturing image data of the plurality of objects containing respective images of the objects; a memory storing reference models, each comprising images of each of different kinds of reference objects corresponding to images captured by said first image capturing device...." Claim 12 patentably distinguishes over the prior art.

Independent claim 23 recites: "...storing reference images corresponding to images of the workpiece or an object so shaped (workpiece/object) and reference arrangement information indicating arrangements of the robot and workpiece/object relative to each other when the images were captured, the reference arrangements comprising rotational arrangements of the workpiece relative to the robot..." Claim 23 patentably distinguishes over the prior art.

Withdrawal of the foregoing rejection is requested.

Claims 2-11, 13-22 and 24-32

Claims 2-11, 13-22 and 24-32 depend on one claims 1, 12 or 23, respectively, and are therefore believed to be allowable for at least the foregoing reason.

Withdrawal of the foregoing rejections is requested.

NEW CLAIM

New claim 33 has been added in order to present an alternate recitation of the present invention. No new matter has been added.

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: Jan 20, 2006

By: Gregory W. Harper
Gregory W. Harper
Registration No. 55,248

1201 New York Avenue, NW, Suite 700
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501